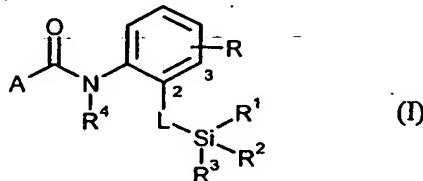


Patent claims

1. Silylated carboxamides of the formula (I)



5

in which

R represents hydrogen, fluorine, chlorine, methyl, isopropyl, methylthio or trifluoromethyl,

L represents a direct bond or represents in each case optionally substituted straight-chain or branched alkylene (alkanediyl), alkenylene (alkenediyl) or alkynylene (alkyndiyl),

10 R¹ and R² independently of one another represent hydrogen, C₁-C₈-alkyl, C₁-C₈-alkoxy, C₁-C₄-alkoxy-C₁-C₄-alkyl, C₁-C₄-alkylthio-C₁-C₄-alkyl or C₁-C₆-haloalkyl,

15 R³ represents hydrogen, C₁-C₈-alkyl, C₁-C₈-alkoxy, C₁-C₄-alkoxy-C₁-C₄-alkyl, C₁-C₄-alkylthio-C₁-C₄-alkyl, C₂-C₈-alkenyl, C₂-C₈-alkynyl, C₁-C₆-haloalkyl, C₂-C₆-haloalkenyl, C₂-C₆-haloalkynyl, C₃-C₆-cycloalkyl, or represents in each case optionally substituted phenyl or phenylalkyl,

20 R⁴ represents hydrogen, C₁-C₈-alkyl, C₁-C₆-alkylsulphanyl, C₁-C₆-alkylsulphonyl, C₁-C₄-alkoxy-C₁-C₄-alkyl, C₃-C₈-cycloalkyl; C₁-C₆-haloalkyl, C₁-C₄-haloalkylthio, C₁-C₄-haloalkylsulphanyl, C₁-C₄-haloalkylsulphonyl, halo-C₁-C₄-alkoxy-C₁-C₄-alkyl, C₃-C₈-halocycloalkyl having in each case 1 to 9 fluorine, chlorine and/or bromine atoms; formyl, formyl-C₁-C₃-alkyl, (C₁-C₃-alkyl)carbonyl-C₁-C₃-alkyl, (C₁-C₃-alkoxy)carbonyl-C₁-C₃-alkyl; halo-(C₁-C₃-alkyl)carbonyl-C₁-C₃-alkyl, halo-(C₁-C₃-alkoxy)carbonyl-C₁-C₃-alkyl having in each case 1 to 13 fluorine, chlorine and/or bromine atoms;

25 (C₁-C₈-alkyl)carbonyl, (C₁-C₈-alkoxy)carbonyl, (C₁-C₄-alkoxy-C₁-C₄-alkyl)carbonyl, (C₃-C₈-cycloalkyl)carbonyl; (C₁-C₆-haloalkyl)carbonyl, (C₁-C₆-haloalkoxy)carbonyl, (halo-C₁-C₄-alkoxy-C₁-C₄-alkyl)carbonyl, (C₃-C₈-halocycloalkyl)carbonyl having in each case 1 to 9 fluorine, chlorine and/or bromine atoms; or -C(=O)C(=O)R⁵, -CONR⁶R⁷ or -CH₂NR⁸R⁹,

30 R⁵ represents hydrogen, C₁-C₈-alkyl, C₁-C₈-alkoxy, C₁-C₄-alkoxy-C₁-C₄-alkyl, C₃-C₈-cycloalkyl; C₁-C₆-haloalkyl, C₁-C₆-haloalkoxy, halo-C₁-C₄-alkoxy-C₁-C₄-alkyl, C₃-C₈-halocycloalkyl having in each case 1 to 9 fluorine, chlorine and/or bromine atoms,

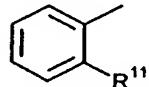
R⁶ and R⁷ independently of one another each represent hydrogen, C₁-C₈-alkyl, C₁-C₄-alkoxy-C₁-C₄-alkyl, C₃-C₈-cycloalkyl; C₁-C₈-haloalkyl, halo-C₁-C₄-alkoxy-C₁-C₄-alkyl, C₃-C₈-halocycloalkyl having in each case 1 to 9 fluorine, chlorine and/or bromine atoms,
 5 R⁶ and R⁷ furthermore together with the nitrogen atom to which they are attached form a saturated heterocycle having 5 to 8 ring atoms which is optionally mono- or polysubstituted by identical or different substituents from the group consisting of halogen and C₁-C₄-alkyl, where the heterocycle may contain 1 or 2 further nonadjacent heteroatoms from the group consisting of oxygen, sulphur and NR¹⁰,

10 R⁸ and R⁹ independently of one another, represent hydrogen, C₁-C₈-alkyl, C₃-C₈-cycloalkyl; C₁-C₈-haloalkyl, C₃-C₈-halocycloalkyl having in each case 1 to 9 fluorine, chlorine and/or bromine atoms,

15 R⁸ and R⁹ furthermore together with the nitrogen atom to which they are attached form a saturated heterocycle having 5 to 8 ring atoms which is optionally mono- or polysubstituted by identical or different substituents from the group consisting of halogen and C₁-C₄-alkyl, where the heterocycle may contain 1 or 2 further nonadjacent heteroatoms from the group consisting of oxygen, sulphur and NR¹⁰,

R¹⁰ represents hydrogen or C₁-C₆-alkyl,

A represents the radical of the formula (A1)

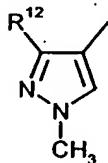


(A1) in which

20 R¹¹ represents hydrogen, halogen, hydroxyl, cyano, C₁-C₆-alkyl, C₁-C₄-haloalkyl, C₁-C₄-haloalkoxy or C₁-C₄-haloalkylthio having in each case 1 to 5 halogen atoms,

or

25 A represents the radical of the formula (A2)

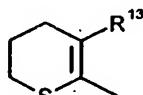


(A2) in which

R¹² represents chlorine, iodine or dichloromethyl,

or

A represents the radical of the formula (A3)

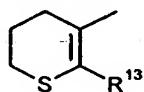


(A3) in which

R¹³ represents C₁-C₄-alkyl or C₁-C₄-haloalkyl having 1 to 5 halogen atoms,

or

A represents the radical of the formula (A4)



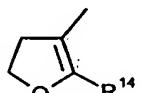
(A4) in which

5

R¹³ represents C₁-C₄-alkyl or C₁-C₄-haloalkyl having 1 to 5 halogen atoms,

or

A represents the radical of the formula (A5)

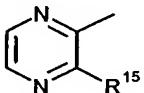


(A5) in which

10 R¹⁴ represents C₁-C₄-alkyl or C₁-C₄-haloalkyl having 1 to 5 halogen atoms,

or

A represents the radical of the formula (A6)

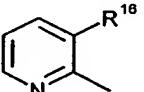


(A6) in which

15 R¹⁵ represents hydrogen, halogen, C₁-C₄-alkyl or C₁-C₄-haloalkyl having 1 to 5 halogen atoms,

or

A represents the radical of the formula (A7)

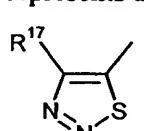


(A7) in which

20 R¹⁶ represents halogen, hydroxyl, C₁-C₄-alkyl, C₁-C₄-alkoxy, C₁-C₄-alkylthio, C₁-C₄-haloalkyl, C₁-C₄-haloalkylthio or C₁-C₄-haloalkoxy having in each case 1 to 5 halogen atoms,

or

A represents the radical of the formula (A8)

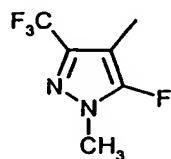


(A8) in which

25 R¹⁷ represents C₁-C₄-alkyl,

or

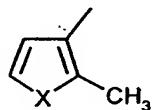
A represents the radical of the formula (A9)



(A9),

or

A represents the radical of the formula (A10)



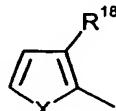
(A10) in which

5

X represents O (oxygen) or S (sulphur),

or

A represents the radical of the formula (A11)



(A11) in which

10

X represents O (oxygen) or S (sulphur),

R¹⁸ represents iodine or methyl.

2. Silylated carboxamides of the formula (I) according to Claim 1, characterized in that

15 R represents hydrogen, fluorine, chlorine, methyl or trifluoromethyl,

L represents a direct bond or represents in each case optionally halogen-substituted straight-chain or branched C₁-C₆-alkylene, C₂-C₆-alkenylene or C₂-C₆-alkynylene,R¹ and R² independently of one another represent C₁-C₆-alkyl, C₁-C₆-alkoxy, C₁-C₃-alkoxy-C₁-C₃-alkyl or C₁-C₃-alkylthio-C₁-C₃-alkyl,20 R³ represents C₁-C₆-alkyl, C₁-C₆-alkoxy, C₁-C₃-alkoxy-C₁-C₃-alkyl, C₁-C₃-alkylthio-C₁-C₃-alkyl, C₃-C₆-cycloalkyl, phenyl or benzyl,R⁴ represents hydrogen, C₁-C₆-alkyl, C₁-C₄-alkylsulphanyl, C₁-C₄-alkylsulphonyl, C₁-C₃-alkoxy-C₁-C₃-alkyl, C₃-C₆-cycloalkyl; C₁-C₄-haloalkyl, C₁-C₄-haloalkylthio, C₁-C₄-haloalkylsulphanyl, C₁-C₄-haloalkylsulphonyl, halo-C₁-C₃-alkoxy-C₁-C₃-alkyl, C₃-C₈-halocycloalkyl having in each case 1 to 9 fluorine, chlorine and/or bromine atoms;25 formyl, formyl-C₁-C₃-alkyl, (C₁-C₃-alkyl)carbonyl-C₁-C₃-alkyl, (C₁-C₃-alkoxy)carbonyl-C₁-C₃-alkyl; halo-(C₁-C₃-alkyl)carbonyl-C₁-C₃-alkyl, halo-(C₁-C₃-alkoxy)carbonyl-C₁-C₃-alkyl having in each case 1 to 13 fluorine, chlorine and/or bromine atoms;

(C₁-C₆-alkyl)carbonyl, (C₁-C₄-alkoxy)carbonyl, (C₁-C₃-alkoxy-C₁-C₃-alkyl)carbonyl, (C₃-C₆-cycloalkyl)carbonyl; (C₁-C₄-haloalkyl)carbonyl, (C₁-C₄-haloalkoxy)carbonyl, (halo-C₁-C₃-alkoxy-C₁-C₃-alkyl)carbonyl, (C₃-C₆-halocycloalkyl)carbonyl having in each case 1 to 9 fluorine, chlorine and/or bromine atoms, or -C(=O)C(=O)R⁵, -CONR⁶R⁷ or -CH₂NR⁸R⁹,

5 R⁵ represents hydrogen, C₁-C₆-alkyl, C₁-C₄-alkoxy, C₁-C₃-alkoxy-C₁-C₃-alkyl, C₃-C₆-cycloalkyl; C₁-C₄-haloalkyl, C₁-C₄-haloalkoxy, halo-C₁-C₃-alkoxy-C₁-C₃-alkyl, C₃-C₆-halocycloalkyl having in each case 1 to 9 fluorine, chlorine and/or bromine atoms,

10 R⁶ and R⁷ independently of one another each represent hydrogen, C₁-C₆-alkyl, C₁-C₃-alkoxy-C₁-C₃-alkyl, C₃-C₆-cycloalkyl; C₁-C₄-haloalkyl, halo-C₁-C₃-alkoxy-C₁-C₃-alkyl, C₃-C₆-halocycloalkyl having in each case 1 to 9 fluorine, chlorine and/or bromine atoms,

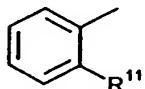
15 R⁶ and R⁷ furthermore together with the nitrogen atom to which they are attached form a saturated heterocycle having 5 or 6 ring atoms which is optionally mono- to tetrasubstituted by identical or different substituents from the group consisting of halogen and C₁-C₄-alkyl, where the heterocycle may contain 1 or 2 further non-adjacent heteroatoms from the group consisting of oxygen, sulphur and NR¹⁰,

R⁸ and R⁹ independently of one another represent hydrogen, C₁-C₆-alkyl, C₃-C₆-cycloalkyl; C₁-C₄-haloalkyl, C₃-C₆-halocycloalkyl having in each case 1 to 9 fluorine, chlorine and/or bromine atoms,

20 R⁸ and R⁹ furthermore together with the nitrogen atom to which they are attached form a saturated heterocycle having 5 or 6 ring atoms which is optionally mono- or polysubstituted by identical or different substituents from the group consisting of halogen and C₁-C₄-alkyl, where the heterocycle may contain 1 or 2 further non-adjacent heteroatoms from the group consisting of oxygen, sulphur and NR¹⁰,

25 R¹⁰ represents hydrogen or C₁-C₄-alkyl,

A represents the radical of the formula (A1)

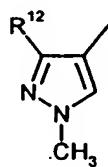


(A1) in which

30 R¹¹ represents hydrogen, fluorine, chlorine, bromine, iodine, hydroxyl, cyano, C₁-C₄-alkyl, C₁-C₂-haloalkyl, C₁-C₂-haloalkoxy or C₁-C₂-haloalkylthio having in each case 1 to 5 fluorine, chlorine and/or bromine atoms,

or

A represents the radical of the formula (A2)

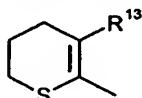


(A2) in which

R¹² represents chlorine, iodine or dichloromethyl,

or

A represents the radical of the formula (A3)



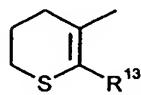
(A3) in which

5

R¹³ represents methyl, ethyl or C₁-C₂-haloalkyl having 1 to 5 fluorine, chlorine and/or bromine atoms,

or

A represents the radical of the formula (A4)



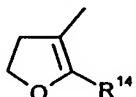
(A4) in which

10

R¹³ represents methyl, ethyl or C₁-C₂-haloalkyl having 1 to 5 fluorine, chlorine and/or bromine atoms;

or

A represents the radical of the formula (A5)



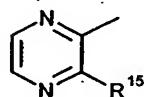
(A5) in which

15

R¹⁴ represents methyl, ethyl or C₁-C₂-haloalkyl having 1 to 5 fluorine, chlorine and/or bromine atoms,

or

A represents the radical of the formula (A6)



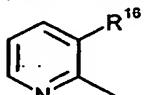
(A6) in which

20

R¹⁵ represents hydrogen, fluorine, chlorine, bromine, methyl, ethyl or C₁-C₂-haloalkyl having 1 to 5 fluorine, chlorine and/or bromine atoms,

or

A represents the radical of the formula (A7)



(A7) in which

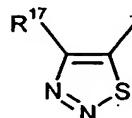
25

R¹⁶ represents fluorine, chlorine, bromine, iodine, hydroxyl, C₁-C₄-alkyl, méthoxy, ethoxy, methylthio, ethylthio, difluoromethylthio, trifluoromethylthio, C₁-C₂-haloalkyl or C₁-C₂-haloalkoxy having in each case 1 to 5 fluorine, chlorine and/or bromine atoms,

5

or

A represents the radical of the formula (A8)



(A8) in which

R¹⁷ represents methyl, ethyl, n-propyl or isopropyl,

or

10

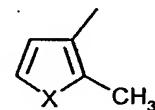
A represents the radical of the formula (A9)



(A9),

or

A represents the radical of the formula (A10)



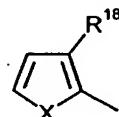
(A10) in which

15

X represents O (oxygen) or S (sulphur),

or

A represents the radical of the formula (A11)



(A11) in which

20

X represents O (oxygen) or S (sulphur),

R¹⁸ represents iodine or methyl.

25

3. Process for preparing silylated carboxamides of the formula (I) according to Claim 1, characterized in that

a) carboxylic acid derivatives of the formula (II)

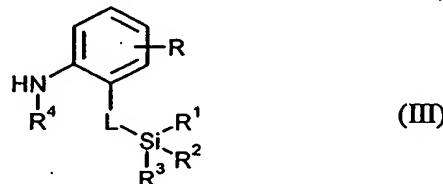


in which

X^1 represents halogen or hydroxyl and

A is as defined in Claim 1

5 are reacted with amines of the formula (III)

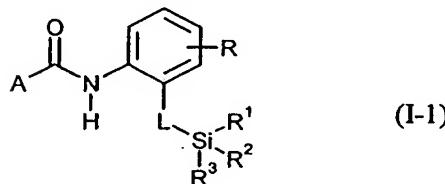


in which R, L, R^1 , R^2 , R^3 and R^4 are as defined in Claim 1,

if appropriate in the presence of a catalyst, if appropriate in the presence of a condensing agent, if appropriate in the presence of an acid binder and if appropriate
10 in the presence of a diluent,

or

b) silylated carboxamides of the formula (I-1)



in which R, L, R^1 , R^2 , R^3 and A are as defined in Claim 1,

15 are reacted with halides of the formula (VIII).



in which

X^2 represents chlorine, bromine or iodine,

R^{4a} represents $\text{C}_1\text{-C}_8\text{-alkyl}$, $\text{C}_1\text{-C}_6\text{-alkylsulphinyl}$, $\text{C}_1\text{-C}_6\text{-alkylsulphonyl}$, $\text{C}_1\text{-C}_4\text{-alkoxy-C}_1\text{-C}_4\text{-alkyl}$, $\text{C}_3\text{-C}_8\text{-cycloalkyl}$; $\text{C}_1\text{-C}_6\text{-haloalkyl}$, $\text{C}_1\text{-C}_4\text{-haloalkylthio}$, $\text{C}_1\text{-C}_4\text{-haloalkylsulphinyl}$, $\text{C}_1\text{-C}_4\text{-haloalkylsulphonyl}$, halo- $\text{C}_1\text{-C}_4\text{-alkoxy-C}_1\text{-C}_4\text{-alkyl}$, $\text{C}_3\text{-C}_8\text{-halocycloalkyl}$ having in each case 1 to 9 fluorine, chlorine and/or bromine atoms; formyl, formyl- $\text{C}_1\text{-C}_3\text{-alkyl}$, $(\text{C}_1\text{-C}_3\text{-alkyl})\text{carbonyl-C}_1\text{-C}_3\text{-alkyl}$, $(\text{C}_1\text{-C}_3\text{-alkoxy})\text{carbonyl-C}_1\text{-C}_3\text{-alkyl}$; halo- $(\text{C}_1\text{-C}_3\text{-alkyl})\text{carbonyl-C}_1\text{-C}_3\text{-alkyl}$, halo-($\text{C}_1\text{-C}_3\text{-alkoxy})\text{carbonyl-C}_1\text{-C}_3\text{-alkyl}$ having in each case 1 to 13 fluorine, chlorine and/or bromine atoms;

$(\text{C}_1\text{-C}_8\text{-alkyl})\text{carbonyl}$, $(\text{C}_1\text{-C}_8\text{-alkoxy})\text{carbonyl}$, $(\text{C}_1\text{-C}_4\text{-alkoxy-C}_1\text{-C}_4\text{-alkyl})\text{carbonyl}$, $(\text{C}_3\text{-C}_8\text{-cycloalkyl})\text{carbonyl}$; $(\text{C}_1\text{-C}_6\text{-haloalkyl})\text{carbonyl}$, $(\text{C}_1\text{-C}_6\text{-alkyl})\text{carbonyl}$

C_6 -haloalkoxy)carbonyl, (halo- C_1 - C_4 -alkoxy- C_1 - C_4 -alkyl)carbonyl, (C_3 - C_8 -halocycloalkyl)carbonyl having in each case 1 to 9 fluorine, chlorine and/or bromine atoms; or $-C(=O)C(=O)R^5$, $-CONR^6R^7$ or $-CH_2NR^8R^9$, where R^5 , R^6 , R^7 , R^8 and R^9 are as defined in Claim 1,

5 in the presence of a base and in the presence of a diluent.

4. Compositions for controlling unwanted microorganisms, characterized in that they comprise at least one silylated carboxamide of the formula (I) according to Claim 1, in addition to extenders and/or surfactants.

10

5. Use of silylated carboxamides of the formula (I) according to Claim 1 for controlling unwanted microorganisms.

15

6. Method for controlling unwanted microorganisms, characterized in that silylated carboxamides of the formula (I) according to Claim 1 are applied to the microorganisms and/or their habitats.

20

7. Process for preparing compositions for controlling unwanted microorganisms, characterized in that silylated carboxamides of the formula (I) according to Claim 1 are mixed with extenders and/or surfactants.